

The Self-Wiring Machine: Development and Functional Organization of Nervous Systems

Since early studies on embryology began nearly one hundred years ago, the question of how a nervous system, with its variety of cell types and seemingly endless numbers of cell interactions, develops has fascinated biologists. Once thought too complex to understand, the details of nervous system development and organization are finally emerging. Through interdisciplinary contributions, biologists are now beginning to understand the biochemistry, cell biology, and physiology of this unique group of cells.

The 1993 Graduate Student Symposium seeks to assemble speakers with expertise in diverse areas of neurobiology to discuss what is currently known, and what intriguing questions remain to be answered. The symposium will explore neurobiology through four different sessions. The first session will be devoted to neurogenesis, and the mechanisms underlying cells' decisions to follow particular neuronal fates. This session will be followed by a discussion of axonal pathfinding, and neuronal migration. There will be a particular focus on factors involved in guiding migrating neurons. The third session will address how migrating neurons recognize their appropriate targets, how they produce functional synapses, and how these two processes may affect terminal neuronal differentiation. The final session will address how neuronal circuitry, established through neuronal migration and synapse formation, functions to allow organisms to respond to an enormous variety of environmental stimuli. In organizing this symposium, we hope to integrate work from many biological disciplines in order to explore the fascinating question of how nervous systems are generated and subsequently function in a variety of organisms.

The 1993 Graduate Student Symposium Committee:

Denise Ippensen

Steve King

Kelly Leader

Kimberly Van Auken

Eric Weiss

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Keynote Address

Seymour Benzer (*California Institute of Technology*)

Studying the Development and Function of Neural Organization

I. Neurogenesis

Spyros Artavanis-Tsakonas (*Yale University*)

Molecular Mechanisms of Early Differentiation of the Ectoderm in *Drosophila melanogaster*

Marianne Bronner-Fraser (*University of California, Irvine*)

Avian Neural Crest Migration

Susan K. McConnell (*Stanford University*)

The Specification of Neuronal Identity in the Mammalian Cerebral Cortex

II. Pathfinding/Migration

Judith S. Eisen (*University of Oregon*)

Motoneuron Pathfinding

Marc Tessier-Lavigne (*University of California, San Francisco*)

Chemoattraction and Axon Guidance

Roger Keynes (*University of Cambridge, UK*)

Segmentation and Neural Development in Vertebrates

III. Target Recognition/Synapse Formation/Differentiation

Story Landis (*Case Western Reserve Medical Center*)

Neuronal Differentiation in Rats

Mu-ming Poo (*Columbia University*)

Neuromuscular Synapses

Ronald W. Oppenheim (*Wake Forest University School of Medicine*)

Programmed Cell Death, Neurotrophic Factors for Motoneuron Survival in Chicks

IV. Sensation/Movement/Long Term Potentiation

John Carlson (*Yale University*)

Olfaction in *Drosophila melanogaster*

Nicholas J. Strausfeld (*University of Arizona*)

Visual Control of Flight and Motor Patterns

Daniel L. Alkon (*National Institutes of Health, Bethesda*)

Molecular Events in Learning